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New 3D documentation reveals carved Stone Age and Bronze Age axes at Nämforsen, in Ångermanland, Sweden

Introduction

The petroglyphs at Nämforsen in Ångermanland, Sweden are a masterpiece among the Scandinavian rocks carvings, with its massive imagery of elks, ships and humans. The magnificent situation in the midst of the plangent rapids reinforces the northern accent. Although clear southern elements such as weapons, footprints and circle-crosses occur, the relatively low frequency of these phenomena seemingly has not affected the overall interpretation and dating of the site to any significant extent.

However, some ship types differ significantly from the typically northern ones. In addition, finds from the nearby settlements, at Ställverket and at Råinget, clearly demonstrates that their main occupation period was the Bronze Age, a time when it has been argued that the practice of making rock carvings had ceased (Baudou 1993, Forsberg 1993, c.f. Käck 2001, George 2001, Käck 2009). Although this scenario could be possible, the explanation still seems a little strange. Spontaneously, it should have been the other way around: that the use to make rock carvings should have peaked when the settlements did. It has previously been discussed whether this contradictory situation reflects a prehistoric reality or resulting from an interpretative discourse assuming that the carvings demonstrate an actual difference, pictorial, chronological and social, between northern hunting and southern farming cultures (Bertilsson 2015 and 2017) However, as all the new information from the last decade's extensive archaeological excavations has been brought to light a more nuanced picture has begun to emerge (cf. Nykvist 2007). In harmony with this the intention here is to present the results of the new 3D documentation of the rock carvings. Results that bring brand new information and creates new conditions for deepening and widening the scientific discussion on dating and understanding of the complex and intriguing images carved into the rocks at Nämforsen.

The 3D documentation has been accomplished since 2015 by using digital photography and SfM technology. The documentation work has been reported continuously in other contexts (Bertilsson & Bertilsson 2015, Bertilsson 2016, Bertilsson & Bertilsson 2017 and 2018). The 3D documentation normally encompasses complete rock carvings surfaces but may occasionally focus on particularly interesting motifs and details. This may relate to different scenes and figure types such as

elks, humans and ship figures or, like here, weapon figures. Although weapons are not a category that dominates the more than 3,000 separate images registered, they may, as has been demonstrated in other contexts, be of crucial importance for the interpretation and dating of specific carvings (e.g. Ling & Bertilsson 2016, Bertilsson 2018).

The weapons and wielders

The weapons previously studied are mainly the pick shaped axes depicted on several carvings on Laxön and Notön. Gustaf Hallström made a detailed comparison with the carvings of long-hafted scythe shaped tools with wide and slightly curved blades at Vingen in Norway without succeeding in getting the dating of the two sites to coincide. He finally sticks to the opinion that "the best fit" is the hafted Russian flint-sickles (Hallström 1960). None of these suggestions seems entirely convincing. His also focused on a type of object he calls "elk head axes" resulting in him primarily searching for eastern role models instead of western and southern ones which, as our analysis will show, would have been more relevant. When the new 3D documentation has now been accomplished, we aim at re-analysing this specific research problem in order to see if this extensive digital data may help us to clarify the interpretation and dating of these carvings. The analysis will target carvings with weapons, individual ones and those wielded by humans. For practical reasons, the analysis is concentrated to panels that 3D documentation have been accomplished for and the following rock carvings are included:
Laxön C1, D4, D17 and G3. Fig. 1.

Weapon and warriors on Laxön C1

At Laxön there are several remarkable images of different axe types and of warriors. On the large, deeply carved and beautifully designed panel C1, which is dominated by elks, there are at least three

Fig. 1. Map of the rock carving area at Nämforsen in Ångermanland, Sweden. After Hallström 1960.

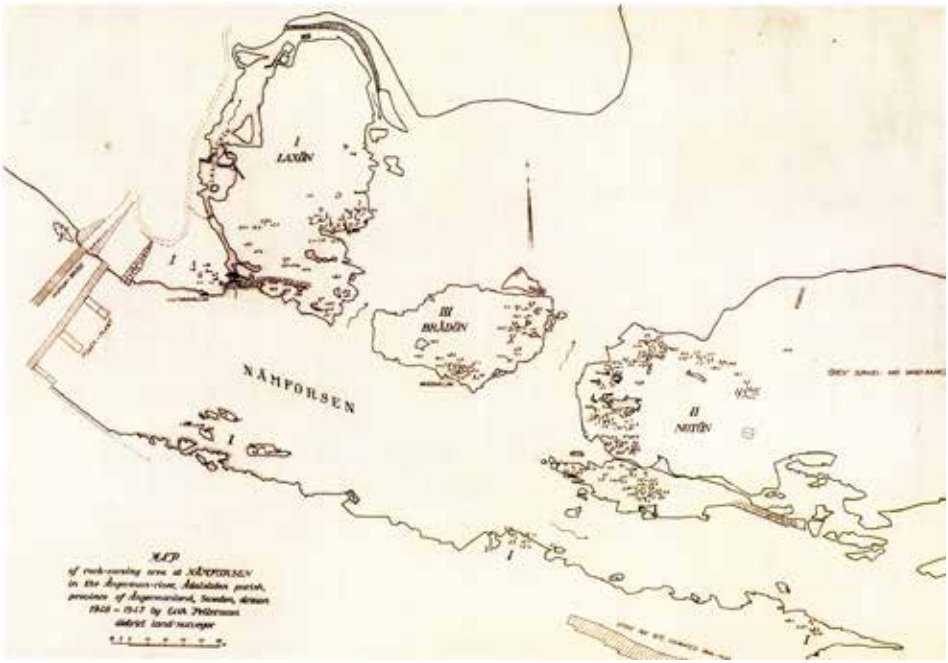


Fig. 2. Laxön C1. Comparison between painted figures (2018) and Evers frottage (1970). Photo: Catarina Bertilsson, SHFA.

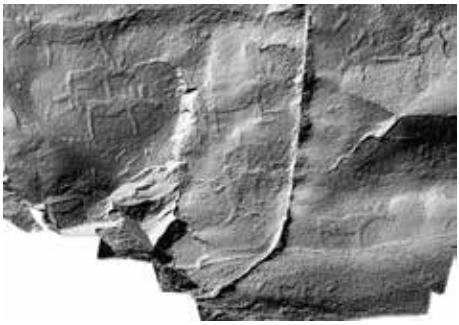


Fig. 3. Laxön C1. The same motif in photogrammetry showing that the shield is irregularly rectangular with ox-hide ingot-like shape. Snapshot from Mesh Lab model. Photo: Catarina Bertilsson, SHFA.

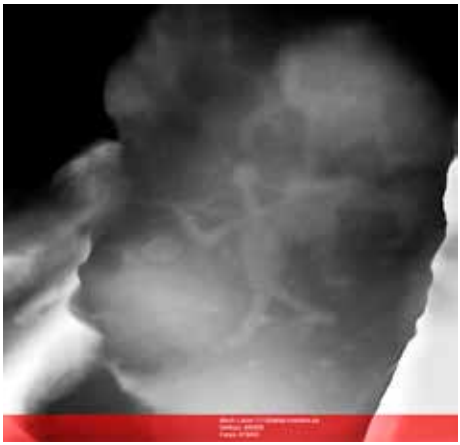


Fig. 4. Depth map of the same motif where the shape of the shield appears even clearer. The shield partially superimposes an elk figure. Depth map from Mesh Lab model. Digital processing: Catarina Bertilsson, SHFA.

armed human figures. One of these has a rounded, beaked head and is armed with a spear and a shield with a shape reminiscent of an ox hide ingot (Fig. 2-4). Comparing the now painted warrior figure with the one on Dietrich Evers frottage some differences in the reproduction become evident. In the frottage, the warrior's spear has a branching and the shield a strange horizontal position. The reason for these deviations is most likely the quartz paths that are clearly visible in the photo

Fig. 5. Laxön C1. Human with rectangular rounded head and two looped staves, the left with a shaft hole axe of a type common in period II of the Nordic Bronze Age, often called cult or ceremonial axe (Montelius 1917, Kristiansen & Larsson 2005 an Fig. 22). Opposed to the axe is spear on an arm protruding from the back of an elk. A stave with angled upper part, superimposed by an elk, is also located above the bronze axe. Snapshot from Mesh Lab model with texture. Photo: Catarina Bertilsson, SHFA.

Fig. 6. Laxön C1. Same motif as in fig. 5 without texture. Photo: Catarina Bertilsson, SHFA.

Fig. 7. Laxön C1. Small herd of elks and a human armed with a flanged axe of Early Bronze Age type with swivelled edge. In the left hand, the human holds a weapon of unknown type that seems to connect to the tail of an elk. Snapshot from Mesh Lab model. Photo: Catarina Bertilsson, SHFA.

which are higher than the surrounding rock surface. The depth map shows that the spear gets wider at the front end, which may indicate a spearhead. The depth map also shows, which is confirmed by the 3D-model with no texture, that the shield has a slightly skewed square shape similar of an oxhide ingot of the "Kissenbarren" type. An ingot of this type is depicted on a panel at Himmelstalund in Östergötland, Sweden with a suggested dating to the transition between period II and III of the Nordic Bronze Age around 1500 BC (Ling& Stos-Gale 2015).

In Fig. 5, there is a human with a large rectangular rounded head and a looped stave in each hand. The right stave (Fig. 6) is crowned by an axe that undoubtedly depicts a shaft hole axe in bronze from period II of the Nordic Bronze Age (1500-1300 BC) (Montelius 1917, Fig. 22 below!). An elk, which complicates the typing, superimposes the left stave that might be provided with an angled blade. A similar object that is also superimposed by an elk is connected to the bronze axe's blade. And additionally, a spear that appears to be held by an arm protruding from the shoulder of an elk. The elk is facing left whilst the spear is pointed right towards the edge of the bronze axe. The composition is strange and suggests a complicated relationship between the weapons, the human and the elks. It also allows for some observations important for dating the figures; an elk superimposes one stave held by the axe wielder and must therefore be later carved than this. If we assume that this stave is contemporary with the stave with the bronze axe from period II, then the elk must be later. How much later is not clear but still the earliest possible dating is period II. This indicates that most elks of this type on this panel should be contemporary looking alike.

In Fig. 7 is yet another axe from the Early Bronze Age depicted in a scene with a small herd of elks and a human armed with a hafted flanged axe with the edge heavily flared. This axe type dates to the 1st period of the Nordic Bronze Age, 1700-1500 BC, (Montelius 1917 and Fig. 22). In the left hand, the warrior holds an irregular funnel-shaped implement that seems to connect to the tail of an elk. An almost identical object is depicted on one of the carvings in the Vingen complex in Sogn og Fjordane in Norway (Klungseth Lødøen & Mandt 2012: 241). This may also depict a flanged axe.

The long horned warrior on Laxön D4. (Fig. 8).

Most notably, this long-horned warrior has a large right hand with fingers marked and wears a sword with a curved scabbard

Fig.8. Laxön D4. Twin horned warrior with right hand with big fingers and curved sword sheath with triangular chape partially superimposed by a contoured elk. Snapshot from Mesh Lab model with texture. Photo: Catarina Bertilsson, SHFA.

Fig. 9. Laxön D4. The same motif as above without texture. Here it appears that the horns were originally much shorter and have been lengthen. Snapshot from Mesh Lab model. Photo: Catarina Bertilsson, SHFA.

and triangular chape. A thorough analysis of the new 3D documentation reveals that the horns were originally shorter and seems to have been lengthened (Fig. 9). This may imply an early dating which is strengthened by the curved scabbard, which may have enclosed a curved sword, possibly a scimitar of Rörby type from period IB of the Nordic Bronze Age (Kaul 1998, Kristiansen & Larsson 2005). Curved swords and scimitars are extremely rare on rock carvings but on a panel in Kville in Bohuslän, Sweden such an individual sword were depicted together with another sword, which is more modestly curved. On the same panel there are interestingly two axes of the Fårdrup type, a role models in bronze axes having shaft hole. As with curved swords, this type of is dated to period IB about 1600 BC (Montelius 1917). The twin horned warrior on D4 is superimposed by a contoured elk, which shows that even this type of elk has been carved in period IB or later (Fig. 10).

Fig. 10.Laxön. D4. Depth map of the horned warrior who clearly shows the details described above. Depth map from the Mesh Lab model. Digital processing: Catarina Bertilsson, SHFA.

The pick-shaped and hooked axes on Laxön D1. Fig.11.

This carving situated on a large boulder with a slightly retracted position on Laxön has a scattered composition of some small boats, some small contoured elks, some fragmentary figures and, in the central part, also at least four hooked or pick-

Fig. 11. Laxön D17. Pick-shaped and hooked axes, elks and boats carved on boulder. The hooked axes show a great similarity to carved axes on megalith tombs in Brittany, France and at Vingen, Norway. Snapshot from Mesh Lab model. Photo: Catarina Bertilsson, SHFA.

shaped axes. One of these is hook-shaped and shows great similarity to the axes carved on the megalithic tomb in Les Trois Squelettes in Brittany, France (Twohigh 1981). Similar axes, but often with more curved eggs, are also depicted on the carvings at Vehammaren in Vingen, Norway (Klungseth Lødøen & Mandt 2012).

The hafted axe on Laxön G3. Fig. 12

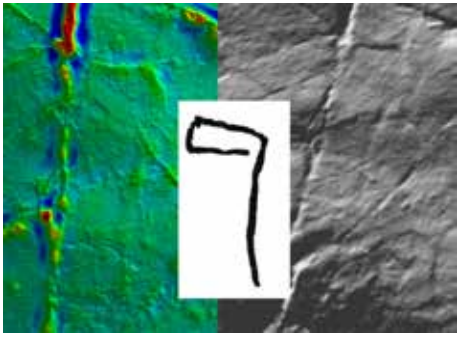
This panel is located above the large carving at Lillforshällan G1, right next to the footpath, which was previously passing directly over the panel. Hallström documented some figures; two elks in the eastern part and some fragmentary figures in the middle part and a pick-shaped axe in the southern part. An axe in the central part is reported as being documented by Hallström (Larsson, Broström et al 2018). However, this is not correct because it is missing on his original plan (Hallström 1960, Pl. XIV, G: 3) In the 2003 inventory, another axe, a fish, 4 elks and about 10 indeterminate figures were registered (Larsson & Broström 2011). In recent years, a few more cutter-shaped figures have been added to the southeast part and a

Fig. 12.Laxön G3. On this panel there are several completely carved elk figures, some human figure and a number of lines and fragmentary figures that cannot be typed. In the centre there is a hafted axe. cf. fig. 10. Snapshot from Mesh Lab model. Photo: Catarina Bertilsson, SHFA.

foot sole or axe-shaped figure in the western part. None of the latter figures are documented but, like the other figures, still painted.

The question is whether these figures have been interpreted and recorded incorrectly? That is of course possible. However, the SfM documentation undoubtedly verifies the figures, the axes included. It therefore seems that the interpretation is correct at least regarding the axes in Larsson & Broström's report (2011). One possible reason for the difficulty to identify the figures is that the repeated painting

Fig. 13. Laxön G3. Triptych of hafted axe of a type carved on megalith tombs in Brittany, France. Left: Color depth map from Mesh Lab model. MRM-processing: Ylber Qallaki, SHFA. Middle: Drawing of axe on Megalith tomb Mané Lud. Right: snapshot from Mesh Lab model without texture. Photo: Catarina Bertilsson, SHFA.



fills up and smooth out the carvings by gradually reducing the relief. This effect has been observed on other panels at Nämforsen and elsewhere (Bertilsson 2015b). It was already noted in the 2015 report that: "The figures are very shallow and reproduced with limited 3D effect and are hardly visible in the ply format image without texture. The painting increases the visual contrast but simultaneously blurs the relief effect "(Bertilsson & Bertilsson 2015). Another cause may be that this panel has previously been in the middle of footpath and has been worn down by all feet having trampled it.
In order to facilitate the analysis of the figures a depth map was produced (Fig. 13). It is especially worth noting that one axe, the lower one with an almost rectangular blade, is of a, on the Scandinavian carvings, unique type. It actually resembles a type that usually occurs on megaliths in Brittany, France (Fig. 12 and 13, Twohig 1981, Cunliffe 2017, Schulz Pålsson 2017). It may indicate that the arrowhead of the Bell Beaker type that was found on the Ställverket settlement site is not the only indication of contacts with this in the Neolithic expansionary culture complex (Bertilsson 2017).

The magnificent ship on Notön C6-C7- Fig. 14.

This panel is slightly arched but is relatively smooth. It is almost completely covered by a densely grown layer of moss and lichen. Some figures are still visible and reveal that the carving at some occasion

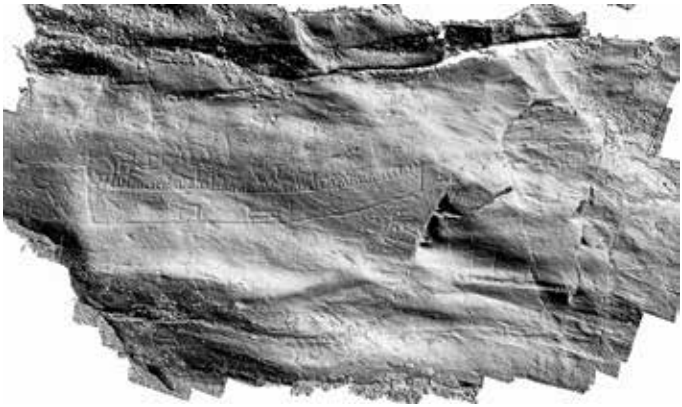


Fig. 14. Notön C6-7. The largest and most magnificent ship at Nämforsen with so numerous attributes and details that it overshadows most similar ship carvings in southern Scandinavia. Snapshot from Mesh Lab model. Photo: Catarina Bertilsson, SHFA.

Fig. 15. Notön C6-7. Detail of the ship's front part showing among the ordinary staffing stokes, from the right, a pick shaped axe, a triangular figure with twin horned head whose body and arms are composed of two pal staves, and further left another pal stave and two more hafted axes. Rubbing: Dietrich Evers, SHFA.

Fig. 16. Notön C6-7. Depth map of the same motif as above. Snapshot from MeshLab model. Digital processing: Catarina Bertilsson, SHFA.

Fig. 17. Notön C6-7. In total, almost 10 axes of different type are depicted on the carving. Most of them individually in one, from the stern toward the middle of the ship, rising row but some are also integrated body parts of the torsos or arms. Yet another horned warrior may be composed of two pal staves. The stern of the ship is also axe adorned. Rubbing: Dietrich Evers, SHFA.

has been painted red. Although having recently been sprinkled with technical alcohol no effect of it yet appears. The SfM-Documentation was made at two occasions in 2017, and with additional photos in 2018, to further enhance the quality of the 3D model. It appears the SfM technology in case like this literally sees through the cover of moss and lichens.

This carving is one of the most remarkable and most interesting at Nämforsen and is dominated by the more than 2 meter long ship with nearly 50 staffing strokes, 9 human figures with triangular torso of the same type as on the carved on the slate arrowheads found on Notön and also from the settlement site at Råinget. Hallström's (1960) recording appearing basically correct. Judging from the rubbing made by Dietrich Evers in the 1970s two of the humans seem to have axe-like arms. At least one of these humans also have twin horned head. The hull of this ship superimposed by a small elk and a boat (Fig.15 and 17). Notwithstanding, these previous documentations, a thorough analysis of the 3D-documentation yielded significantly more information about the figures on carvings. An illustrative example of this is that the depth map produced in 2018. (Fig. 16) It provides a more detailed picture and confirms that the triangular torso of the twin horned warrior is in fact is composed of the shaft, and the upper arms of the blades of axes of the pal stave type dating to the 2nd period of the Nordic Bronze Age (Montelius 2017). Further, another such axe in the same position, composing the left upper arm of the warrior to the left of the first. His right upper arm, on the other hand, seems to be composed of a pick-shaped axe with a curved blade. In total, almost 10 axes of the latter type are depicted on the carving (Fig.17). Most of them individually in one, from the stern toward the middle of the ship, rising row but some are also integrated body parts of the torsos or arms. Yet another horned warrior may be composed of two pal staves. The stern of the ship is also axe adorned most likely with a pal stave too. However, a more detailed image analysis is required to determine the type with certainty.

The two opposed axes and the two-headed elk on Notön D5 - Fig. 18.

Due to the impermeable growth on this panel, only its' western part could be documented. In that part there are some smaller ships, some carved out elks, one two-headed with one head in front and one behind but both facing forward. Below this elk is a ship (1 m long) in which stands two hafted axes, one shorter and one longer. The short-hafted axe is difficult to type while the longer has an axe blade with shaft hole of a type common during the second period of the Early Bronze Age of (c.f Montelius 1917: fig. 811). In order for a documentation of the entire panel to

Fig. 18. Notön D5. Detail of the panel with a ship and an elk, a short-hafted axe as well as a long-hafted bronze axe with shaft hole from period II of the Nordic Bronze Age. Photo: Catarina Bertilsson, SHFA

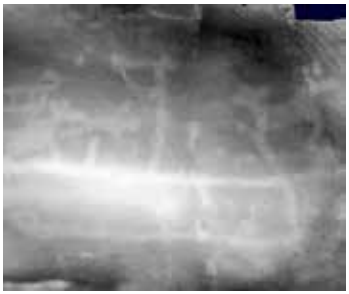


Fig. 19. Notön D5. Depthmap from Mesh Lab model of the same motif. Digital processing: Catarina Bertilsson, SHFA.

be completed, the thick lichen cover must be removed beforehand.

Two warriors holding animal head axes on Notön L4 - Fig. 20.

On this panel, which actually consists of three more surfaces - L3, 5 and 6, a flock of some 10 elks and some humans, of which two are axe wielders. Two of the latter lift up animal headed axes with their left hands. The left of these has extended raised arms and two-fold, possibly mouthed head (c.f. Hallström 1960 cover). The edge part of this axe is rounded and bulging while the neck has two very long ears. The shape of the blade indicates an axe of Early Bronze Age typ. The human to the right of these figures has also extended but downward arms and hanging penis. His axe has a very long,

ig. 20. Notön L4. Two humans lifting axes fitted with two ears. Hallström refers to this axe type "elk head axes" (1960). These axes show great similarities to axes on megalith tombs in Brittany, France (cf. Twohigh 1981). Elks may possibly have inspired the two ears. Snapshot from Mesh Lab model. Photo: Catarina Bertilsson, SHFA.

stave like, shaft and triangular blade in the edge portion and has two short ears at the neck. Hallstöm used the term "elk-head axes" for these axes. However, the first axe shows some similarities to one of those carved on the megalith's tomb Mané er Hroeck in Brittany in France This also applies to the later axe but then also with an axe on the megalith tomb Dissignac (Twohigh 1981). Although none of them can be described as having exactly the same shape but still might be possible role models for the two Nämforsen axes.

A hafted axe with a narrow blade on Notön N2 – Fig. 21.
On this panel there are some distinct and some fragmentary elks and a hafted axe which also resembles narrow bladed axes of Breton megalithic type such as at Dissignac (Twohigh 1980).

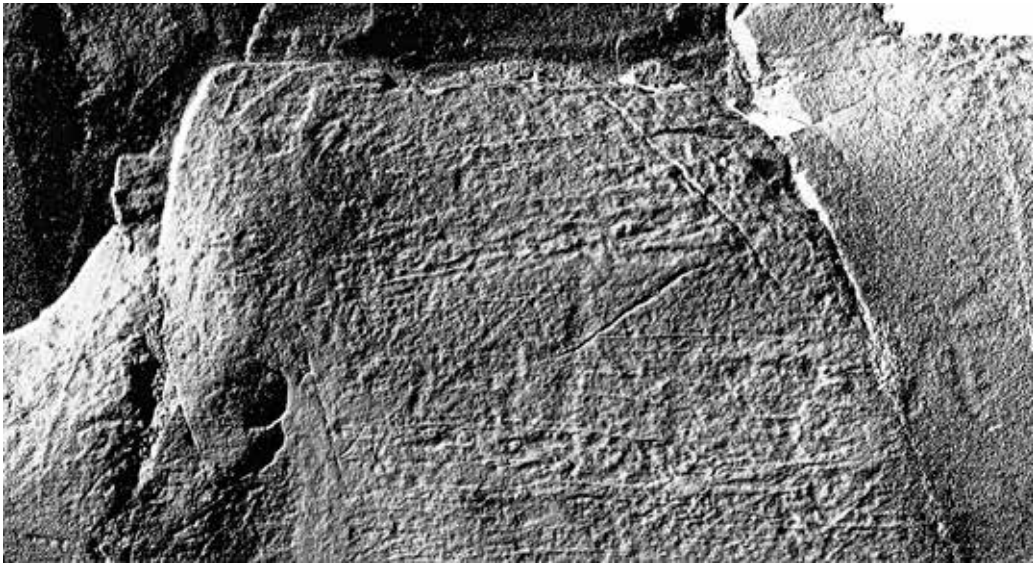
Thus, our presentation of carved axes at Nämforsen is completed. There are certainly more axes but since these have not yet been documented with 3D technology and still are overgrown with thick lichen and moss cover, the analysis of these must wait until more favourable circumstances exist.

However, we have already captured and reported a number of axes of various types being fully adequate for the discussion on dating and interpretation that will soon follow. Therefore we have formulated a number of relevant research issues based on the presentation of the new information obtained through the digital 3D-documentation. Issues, which hopefully will bring more clarity to basic chronological and contextual conditions.

Research issues

Are some of the Nämforsen axes really of the same type as those of the Breton megaliths?
Yes, it seems so because several different axe figures carved on various panels, among others Laxön C1, D17 and G3 depict axes that are strikingly similar to those carved on megalithic tombs in Brittany. This applies to both simple hook-shaped axes, and more advanced axes with wider

FFig. 21. Notön N2. On this panel there are some distinct and some fragmentary elks and a hafted axe with narrow blade of Breton megalithic type such as at Dissignac. Snapshot from Mesh Lab model. Photo: Catarina Bertilsson, SHFA.



blades and those with special details such as curved necks or ears. There are also parallels to the pick-shaped ones (c.f Twohigh 1981, Cunliffe 2017).

If so, how old might they be? Are there any "safe" dates for the Breton axes and if so, what Age?

These issues are complicated because of the fact that one the megalithic axe carvings may not have been carved at the same time as the construction of the tomb. However, some of the axes being originally carved on erected menhirs, that were later overturned and broken in large blocks and slabs, which, hence are older than the graves, they are now included in. If we follow this reasoning, the Grah Niaul tomb with carvings of simple hooked axes is dated to the fifth millennium BC (Bettina Schulz Paulsson personal communication). An interesting fact for our analysis is that this matches the dating of the rock carvings at Vingen, Norway, which has a number of carvings of hooked axes similar to those in Brittany (Klungseth Lødöen & Mandt 2012). These carvings are dated to the period between 4 900 and 4 200 BC (Klungseth Lødøen 2013). If this dating could be transferred directly to Nämforsen, that would mean that the group of hooked axes found on Laxön D17 would be earliest and the oldest there.

A somewhat different explanation is that the axes carved on the megaliths in Brittany actually be early halberds with blades of flint with parallels on carvings in northern Italy and in Skåne dating to the middle of the third millennium (Burenhult 1981). Thus, this deviates most significantly from the date proposed above, of the megaliths and of the rock carvings at Vingen. However, it seems that Burenhult (1981) without emphasizing the difference that exists mixes halberds of flint with pal staves with bronze axe blades. Nevertheless, permitting to continue the reasoning above, the next oldest axe depiction might be a completely different axe type found on the G3 panel on Laxön (Fig. 12 above). This axe is a fairly simple hafted axe with an irregular rectangular blade (Cf. Figs. 11-13). The megalithic tomb Mané Lud has been dated to the first half of the 4th millennium cal. BC has carvings of this axe type (Twohigh 1981, Cunliffe 2017, Schulz Paulsson 2017).

How did it happen that such axes were depicted at Nämforsen?

This is one of the core issues in this analysis. One answer is that they were carved by visiting megalith builders even though they did not build any megalithic tombs at Nämforsen. The only megalithic tomb so far known in Middle Norrland is the stone cist at the Lagmansören, which dates to Late Neolithic ca. 2300 BC (Nykist 2007). And, if visiting Nämforsen, the megalith tomb builders may have had the same need had to manifest their presence with axe carvings as "at home" in Brittany. Probably even a bigger need after travelling far and finding themselves at the end of the world. In an unfamiliar and possibly inhospitable environment they did not master fully. If so, the next question comes as a bouncing e-mail:

Did the megalith builders from Brittany really visit Nämforsen that early? Or did people from Nämforsen visit Brittany in the 5th millenium?

Although, it cannot be completely ruled out that people from Nämforsen may actually have visited Brittany, this is probably not the most reasonable explanation for the carvings of the earliest axes. A reason for this would have been that the middle Norland area during the late Mesolithic was still dominated by a hunting and catching economy where people living there could support themselves well on the abundant resources this landscape offered. Because of this, the need to embark on an unsecure many hundred-mile = Swedish mil = 10 000 meters, journey against an unknown goal would not have felt compulsory. Therefore, arguing that the carved axes at Nämforsen also found on the megaliths of Brittany depict identical artefacts, and this required for visits from this remote area, it seems more likely

that the megalith builders may have felt this need in Brittany. This may also have been a realistic alternative when considering the infinite force with which this advanced cultural expression began to spread across Europe at this time (Schulz-Paulsson 2017, c.f. Sørensen 2011).

By which route did the Bretons get to Nämforsen - the sea route or the country road?
Because there are no direct traces or remnants of actual roads from this times the via the country road alternative - is difficult to evaluate. Even if there are no such remnants of seaways either, that seems the most reasonable option. Considering the theoretical speed of the different modes of transport the sea route appears even more likely. Standard calculations set the walking speed to 5 kilometres per hour, the speed of a paddleboat to 7.5 kilometres per hour, and the speed of a simple sailboat to 9, 3 kilometres per hour. If we calculate the distance of the country road to about 350 Swedish mil it would have taken at least 70 days to walk on foot. The length of the seaway is more difficult to calculate, but using the same length it would have taken 47 days with a paddled boat, and about 37 days with a sailed boat. The paddleboat being the most likely alternative, the route would still have taken more than 1.5 months to travel in one direction. A fairly long time, but still perhaps reasonable with the time concepts prevailing during the Stone Age. If such a trip were undertaken in the spring, there would have been possible to spend a few months at Nämforsen before it was time to return to Brittany at the end of summer.

Starting from the bold, and yet unproven, assumption that human groups like the Breton megalith builders – may have had a migration pattern reminiscent of that of the migratory birds. If they, when the days got longer in the spring, headed north to Scandinavia where it also could be warm, but still cooler and healthier during the long bright nights. All the gifts of nature having literally exploded during this short time so, a bold mission like this, may seem completely understandable.

When by sea, via the Baltic Sea and the Bothnian Sea or via the Norwegian west coast?
This question is almost impossible to answer. However, a route via the Norwegian west coast seems possible. It might be indicated by the fact that some axe types on the Åmöy carvings are almost identical to some at Nämforsen. This applies primarily to two hafted axes with triangular edge section on Åmøy nr I and IV: I, which, in this respect looks similar to one axe at Notön L4 (Fig. 20) though, the latter being provided with ears at the neck (Fett & Fett 1941). This is hardly enough evidence to determine which route that was preferred travelling to Nämforsen, but strongly indicates that people with a similar background and ways to carve pictures have visited Åmöy, too. A crucial issue then is the dating of Åmöy carvings. In the absence of a modern documentation and analyses of this important rock art complex, it can be assumed that the oldest ship type there is the Nag ship with upwardly directed beams and hull with board markings. It has been carved in the Nordic Late Neolithic I or II (2400 - 1800 BC) or even slightly earlier (Melheim & Ling 2017).

The author has previously highlighted the fact that some ships at Nämforsen show similarities to Åmøy ships, mainly through the straight form of e.g. Laxön G6 although proportions and details are different (Bertilsson 2017). Before that, it had been brought attention to that precisely this particular feature indicates that these ships would have been sea going, but unsuitable for travelling on rivers and lakes which, required for smaller and shorter boats (Nykvist 2007). It has been suggested that the close to skyrocketing use to depict ships on the rock carvings in south Scandinavia was triggered by the fact that it was the first time that the groups inhabiting the various rock carving areas experi-

enced sea-going ships of a completely different size to those previously used locally (Melheim & Ling 2017). It seems that this difference also occurs at Nämforsen with one group of larger manned ships and another one, usually unmanned, smaller boats. It must then be added that there is also a group at Nämforsen of relatively large single-line ships with elk heads that are manned. Sometimes with humans having articulated arms and heads and lifting elk head staves (Bertilsson 2017). These carvings may belong to an older, and earlier, tradition, an impression that is enhanced by the fact that most of these are found at high locations on Laxön (See below!).

When via the Norwegian west coast via Åmöy and Vingen?

Considering all circumstances it seems less likely that those who carved the megalith axes at Nämforsen would have arrived there via Åmøy outside Stavanger, although similar carving motifs occur there. The dating of certain types of ships on the Åmöy carvings to Late Neolitihic can still make a wider comparison interesting. (See below for further discussion)! How, then, does the alternative relate to the Vingen option? The spontaneous answer is that it seems less likely given the geographical location and the much-varied topography of the landscape in combination with the distance. This would have made a movement between Vingen and Nämforsen both difficult and time consuming. But still, some carved figures indicate a possible relationship. It applies not only to the simple hook-shaped axes and the pal staves as shown above, but also relatively numerous carvings of pick-shaped axes on the localities Vehammaren, Ved Vatnet and Leitet. A number of these axes, mainly on the Urane locality, appear to be decorated with ears (Klungseth Lødøen & Mandt 2012).

However, it appears that none of these axes actually resembles the contoured and short-hafted axe type depicted on the Laxön D17 completely (See Fig. 11.). Instead, they have a narrow shaft and a relatively long, curved scythe shaped axe blade. Although, there is no exact parallel at Nämforsen, the form more resembles some items that are displayed aligned above the railing on the magnificent ship on Notön C6-C7 (See Fig. 17.). Since there are also pal staves from the Early Bronze Age depicted in this ship, it appears reasonable to assume that the axes with scythe shaped blades originate from the same period. If so, with a dating that is at least 2,500 years later than the one proposed for Vingen (Klungseth Lødøen 2013). This strongly indicates that the full answer to the question of the dating of the various carvings of the Vingen complex has not yet been reached. But it must remain unanswered pending a better opportunity.

What was the reason behind the axe carvers going to Nämforsen?

Of course there may have been a number of different reasons, some of which seem more likely, namely:

a) Search for arable land?

This may be the reason why a certain group of people decided to go to Nämforsen despite long distances. Pollen chart shows that cereal cultivation took place in the coastal land and on the light soils on the ridges and slopes along the river valleys of Central Norrland during Late Neolithic but may have started at the end of Middle Neolithic around 2500 BC (Baudou 1977, Welinder 2009, Ramqvist 2017). Whether the cereal cultivation was subsequently carried out since then is unclear, but it is still not a main issue here. In any case the cereal cultivation was probably not been a main reason for going to Nämforsen and surrounding areas at that time. It was probably just one of several components of a bouquet of phenomena that spread in connection with the dynamic development of society and extensive movements of people that took place during this period. Features such as domesticated grazing animals, weapon technology, metalworking and burial technology (C.f.

Ramqvist 2017). In addition, advantages of sea transport and its driving effect on society manifested in rock art have been emphasized earlier (Earle et al. 2015).

b) Search for ore - copper and tin
One reason for embarking on a hundreds of *mil* long journey may have been the search for ore - copper and tin that was needed to produce weapons and other metal objects. It can definitely be a possible cause for the carvings of the various axes being studied here. Since there are images of bronze axes that are type determined into Early Bronze Age, it may seem obvious. But when it comes to the supposed stone axes, it is no longer as obvious. It depends, above all, on the assumption of the dating of these axes to a time that, if correct, would be long before the metal objects emerging in our part of the world. With a source-critical view of the problem, it's an excellent opportunity to question the proposed early dating – 4900-4200 BC. Can it really be correct? That leads us back to the original question of the dating of the axes carved on the megalithic graves in Brittany: are they concurrent with the construction of the graves or have they been carved during a later part of the Neolithic? That question is very difficult to answer and in addition, it requires a more extensive investigation impossible to perform here.

But how would it look if we turned the perspective: might the axes carved at Nämforsen give some indications of the age of the Breton axes? We will return to this interesting question at the end of the study. The previously stated emphasis on Bronze Age also applies to the find material from Ställverk's site and Råinget where, on the latter, also bronze casting was performed (Bertilsson 2017). This, in combination with the findings of bronze artefacts further up in the Ångerman River's tributary system, shows that the knowledge of metal and its use in the manufacturing process of objects was well known. Whether or not this demonstrates proper search for ore is not in any way obvious, the tracks are too sporadic to prove this. At the same time, it has been suggested that this search for ore was an important driving force for the maritime Bell Beaker Culture's spread along the shores of the North Sea area and southern Scandinavia from around 2500 BC and up to the beginning of the Bronze Age (Melheim & Ling 2017). One of this advanced culture's foremost markers is the specially designed "barbed and tanged" arrowhead. Since an arrowhead of this particular type was found on the Ställverk' s site, this alternative seems possible (Bertilsson 2017, cf. Mjærum 2012).

c) Search for other goods
Searching for supplementary information on the dating and placement of the rock carvings, primarily concerns the settlements at Ställverket and Råinget on the southern river bank that have been in use for a period beginning about 4000 BC and, at least regarding Ställverket, not ending until around 1500 AD. However, the emphasis of the settlement period is in both cases on the Bronze Age. On a ledge on the northern riverbank, a settlement was excavated at the beginning of the 2000s. There it turned out that a main purpose of the occupation seems to have been production of red ochre during three different phases starting 4200 BC and terminating 2400 BC. Red ochre is a phenomenon strongly interconnected to the burial custom in the Late Mesolithic and Neolithic. This custom has been found in middle and upper Norrland in graves on the coast and in the inland, and connected to simple burials, stone settings and cairns (Ramqvist 2017). Not to forget its significance for making rock paintings that was widespread in Central Norrland during the Stone Age. The use of red ochre in burials and rock paintings suggests that the substance had an important function in the funerals and that the paintings may also have played an important role in the associated ritual (Sjöstrand 2015).

Therefore it seems likely that the production of this highly valued and sought after

substance was one of the reasons for settling in Nämforsen. The oldest phase of the settlement may then coincide with the latter part of the oldest period conceivable for dating the early axes presented above (D17 and G3) possibly ending 4200 BC. Whether the red ochre production was of such a nature and magnitude that it could also attract interest from groups remote from the area is unclear and lacks evidence. It is most likely that it was intended for surrounding areas along the river valley and the coast. Especially, when considering its close association to burials and graves which may have resulted in certain restrictions (Ramqvist 2017). If the red ochre production also was the reason for settling on the opposite shore at Ställverket can only become a speculation, but the most likely cause would nevertheless be the favourable location at the roaring river mouth just off the seacoast where the supply of salmon, other fish and game must have been abundant. But of course also a position that invited and facilitated communication and contact with outside groups across the sea.

There seems to be a close relation ship between axe lifters and elks. What was the nature of this relationship? Religious? Economic?

And now to a completely different issue: One thing that stands out from our analysis above is the often the proximity and connection between axe bearers, individual axes and elks. At Notön L4 (Fig. 20), the two antropomorphs are in the middle of a herd of elks; on the carving Notön D5 (Fig. 18-19) two elks standing on either side of the two axes standing on the rail of a ship; on Notön C6-7 (Fig. 14 and 17) there is a contoured elk in the ship's hull and several smaller ones around it; on Laxön D17 (Fig. 11) there are moose near the hook-shaped and pick-shaped axes; on the Laxön G3 (Fig. 12-13) there are also some roughly designed elks on the panel; At Laxön C1 (Fig.5-7) there are several tight connections between elks and axes either close contact or superimpositions. In addition, the carvings of the warriors also have this connection. At Laxön C1 (Fig. 2-4), the spear-armed warrior's oxhide ingot shaped shield is superimposed on an elk and appears to at the same time constitute a main part of its body. Another elk has an arm with spear protruding from its back. And finally, the twin horned warrior on Laxön D4 (Fig. 8-10) is partially superimposed by an elk.

This demonstrates, with all the desired clarity, a close connection between the weapons, its wielder and the elk. It probably reflects a strong wish to master the elk and possibly also to hunt it. But when so, there seems to have been practically no intention to depict the actual hunt or killing. Only on one single panel, Laxön D9, the actual killing is indicated by the fact that a large arrow or spearhead penetrates the chest of the body of an elk (Bertilsson & Bertilsson 2015, Larsson & Broström et al. 2018). But otherwise, coexistence between man and elk seems to have prevailed judging from the rock carvings alone. Other kinds of ancient monuments, especially the pitfalls, but also elk bones on settlements, as well as weapons such as arrow and spearheads present a different picture. All in all it indicates that the relationship had a different meaning than a purely economic one and that one was probably not exclusively only looking for the meat of the elk. Since this is an big issue and there is extensive research on the elk's role and importance in cosmology and religion, we will not delve into this exciting theme here (E.g. Lindgren 2001, Sjöstrand 2011).

Do the depiction of the different types of axes belong to the same cultural context?

Are the depicted axes, manufactured either in stone or bronze, an expression of the same cultural context? The answer depends ultimately on the dating these objects; if the earliest dating to the period from 4900 to 4200 BC would be correct, a tight connection becomes difficult to prove, even if there are similarities in design and expression. However, accepting the later dating starting around 2500 BC

there could certainly have existed a connection implying gradual development from Maritime Bell Beaker Culture to early Nordic Bronze Age ditto. Accepting the latter dating and explanation of the axe images' creation period and process, this is certainly a much different scenario than that previously presented for Nämforsen's carving complex by Hallström and other researchers (Bertilsson 2017). In addition, the axe carvings convincingly demonstrate that the contact with the outside world was far greater than previously thought.

Another result of the analysis is that the so-called elk head axes do not seem to occur frequently but only on a few carvings. The most prominent of these is the large carving Laxön G1 on Lillforshällan. There are two larger manned single-line ships of supposedly early, Mesolihtic, type. In these there are one or two objects depicted which could be classified as "elk head axes" one of which is held up by a human-like figure. In the right part of the same carving there are also 3 pick-shaped axes. All of this together may indicate an early dating of this carving possibly be before 4000 BC. According to a recent study by Jan Magne Gjerde even as early as 5000 BC (Gjerde 2017). He further claims that the magnificent ship on Notön C6-7 would date to the Stone Age in a relative sequence without further specification in years. Since we, with the results of the new 3D technology, have been able to show here that there is several axes of pal stave type in this particular ship, this assumption is not correct, but instead it should be brought to one of the first periods of the Nordic Bronze Age. It also implies there an absolute correlation between figure types and shoreline level displacement process does not exist (cf. Gjerde 2016, c.f. Ramqvist 2017). In the case of another boat type, which is depicted at Nämforsen, a smaller, usually unmanned boat occurring in groups or clusters, it shows similarities with boats on the carvings at Hammer and Evenhus (Gjerde 2017). For the larger ships, on the other hand, another context should probably be sought, most likely with, Krabbestig-Åmöy ship types (cf. Melheim & Ling 2017).

Was there a connection to the coastal Cairns?

Since no axes or other weapons from Late Bronze Age or later seems to have been depicted, it's likely that the use of making rock carvings has ceased at that time (cf. Baudou 1993). An important reason might have been the on going land uplift which resulted in the gradual displacement of the sea's shoreline further away from Nämforsen. In combination with the gradual emergence of at least one rapid downstream that would have made the accessibility more difficult.

The present author has previously brought attention to the possibility of a tight connection between the rock carvings and the numerous burial cairns on the coast outside Ångermanälven (Bertilsson 2017). Connections that so far has been difficult to prove empirically but which are likely to have existed in some form. In a recent study by Per Ramqvist (2017) he has made a review of both new and older archaeological studies focussing the cairns. The result is a highly interesting, hypothesis that the transition from an older burial custom with red ochre burials to burying in cairns may have begun already during the transition period Middle - Late Neolithic. Before that, Pia Nykvist (2007) launched the idea that the burial cairns, which lies like a pearl ribbon along the rocky shores of the ancient fjord that led to Nämforsen, had been placed so with intent to show the way to Nämforsen. They were certainly intended as a monument to the dead, but probably also as a guide for the living.

How do the new results affect the traditional interpretation of the carvings?

An attempt to summarize the results of this study looks as follows:

With the help of thorough analyses of the new 3D documentation, a new picture has emerged. The objects that have previously been considered to be elk head axes for the most part turned out to be other types of axes. In most cases, instead, it turns

Fig. 22. The different axe types from Early Nordic Bronze Age depicted on the rock carvings discussed in this paper. From left to right: 1. A flanged axe from period I, 2. A massive shaft hole axe from period I-II, 3 -4. Two types of pal stave axes from period II, 5 – 6. Two types of shaft hole axes from period II (after Montelius 2017).

out to be different types of axes; bronze flanged axes, shaft hole axes or pal stave axes of southern Scandinavian type that can be dated the first two periods of the Nordic Bronze Age – 1700 – 1300 BC (Fig. 22). Thereby, the digital documentation technic has resulted in massive new information creating new conditions for dating and interpretation of the carvings and made possible the conclusion that a much larger proportion of these that belong to a later stage than previously observed. The precise depictions of the Early Bronze Age axes and their clear obvious association with elks also show that they were central elements and not just an exotic foreign object.

At the same time, it is impossible to overlook the fact that a certain number of axes, instead, show similarities to those axes depicted on the early megaliths in Brittany, France (Twohigh 1981). If so, they may have a very early dating - before 4000 BC. Since the Breton carvings are difficult to date, another and a just as likely alternative is that they were carved in connection with later burials from 2500 BC or later. If so, the result would that the chronology of the Breton axes carvings would better match that of the carvings concerned at Nämforsen. This may also harmonises better with the dating of the different boat and ship types there.

A qualified guess is that these axe and ship carvings are a result of the emerging Maritime Bell Beaker Culture on the search for ore and other sought-after goods. A possible side effect may have been that the cereal cultivation spread along their route.

As for the Early Bronze Age, the depiction of some armed warrior figures shows that the area has been influenced by the social development that is particularly prominent in Southern Scandinavia. On Laxön D4 (Fig. 8-10) the twin horned warrior with a sword sheath indicting a curved sword, possibly a scimitar dating to period IB, around 1600 BC, is so far the only known of its kind in Sweden. Possibly, may a certain similarity with warriors depicted on Spanish steles exist? Another exciting discovery is the spearman's shield on Laxön C1(Fig. 4) that resembles an oxhide shaped copper ingot is with a possible dating to period III, 1400-1100 BC or slightly earlier (Ling& Stos-Gale 2015).

Another observation from this study is that the hypothesis regarding completely carved and contoured elks previously to have chronological significance cannot be confirmed (Bertilsson 2017 with references). Although, there are some of the first-mentioned type of elk on the panel Lillforshällan on Laxön that probably was made in the late Mesolithic. There are

just as many on the lower lying Laxön C1, one of which connects tightly to an axe dated to Early Bronze Age. Other such examples also exist e.g. the Early Bronze Age twin horned warrior with right hand having big fingers and carrying a curved sword sheath with triangular chape partially superimposed by a contoured elk (Fig.9-10) The observed difference cannot therefore be explained only by the carving techniques. An approachable way could be to study the design of elk figures in more detail in combination with a more detailed analysis of the carving technique in comparison to the dated weapon based on digital information. But it must stand for another occasion. This also applies to the issue of the dating of weapons figures on the Vingen carvings. The quick review made here suggests that there are several images at Vingen of the same types of weapons there as at Nämforsen and thus possible to date more precisely.

Our review here has shown that the new 3D technology gives rise to a more information-rich and detailed documentation that creates new conditions for dating understanding and interpretation of the rock carvings at Nämforsen. New knowledge that give rise to a more complex but at the same more interesting picture, of the chronological and cultural contexts. And that makes it likely that Nämforsen may have been affected, by an emerging growth during the current period, of a World System (Welinder 2009, Vandkilde 2016). An exciting hypothesis that requires further analysis and testing.

Special thanks to: Catarina Bertilsson SHFA, Bettina Schultz-Paulsson Göteborgs universitet, Trond Lødøen Bergens Universitets Museum, Ylber Qallaki SHFA.

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